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From: Packet-Radio Mailing List and Newsgroup <packet-radio@ucsd.edu>  
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Reply-To: Packet-Radio@UCSD.Edu  
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To: packet-radio

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Today's Topics:

    Need freqs. for 70cm LANs in ATL/north GA  
    Small TNC?

Send Replies or notes for publication to: <Packet-Radio@UCSD.Edu>  
Send subscription requests to: <Packet-Radio-REQUEST@UCSD.Edu>  
Problems you can't solve otherwise to brian@ucsd.edu.

Archives of past issues of the Packet-Radio Digest are available  
(by FTP only) from UCSD.Edu in directory "mailarchives/packet-radio".

We trust that readers are intelligent enough to realize that all text  
herein consists of personal comments and does not represent the official  
policies or positions of any party. Your mileage may vary. So there.

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Date: Tue, 17 Aug 1993 15:36:38 GMT  
From: swrinde!gatech!wa4mei!ke4zv!gary@network.ucsd.edu  
Subject: Need freqs. for 70cm LANs in ATL/north GA  
To: packet-radio@ucsd.edu

In article <ssLe9B1w165w@vulcan.com> kd4cim@vulcan.com (Jerry Pruett - KD4CIM)  
writes:

>larryk@mom.computone.com (larry kollar) writes:

>

>I know the subject says it all. But why do you associate 9600 baud with  
>70cm? (I missed that in my first reply). 19,200 is OK on 2M as far as  
>the FCC is concerned.

Well not quite. The FCC allows baud rates as high as 19.6 kb on 2 meters,  
but they also want us to contain our signals in 20 kHz. With the modulation  
methods in use, basically straight FSK, 19.2 kb doesn't fit in 20 kHz. The  
major energy bandwidth of straight FSK is about 2X the baud rate. It's  
actually more, but for our purposes, that's close enough. 9600 baud FSK is  
just OK on 2 meters, but the packet frequencies in most areas are already  
full of 1200 baud signals, and the two don't coexist well with current  
carrier detect circuits. So the general trend is to move on up to 70 cm,

the next band with lots of commercial equipment available, leaving 223 MHz for longer distance trunks at 9600 and 56kb.

That's actually a good plan because local LANs (I know they should be called MANs, but the terminology is already corrupted) shouldn't be on frequencies with excessive long distance propagation. That allows more spectral reuse via geographic spacing.

>56kb is the next step on 220 and 440. On 900 mhz and above, I think it  
>is pretty well whatever you can devise as long as the signal doesn't go  
>out of band.

That's right.

>There is a "traditional" relationship between bits/second and baud.  
>However, they ain't really the same (I am talking the signalling level,  
>not stuff like V.42bis compression). I ask Gary Coffman at Destructive  
>Testing Systems to comment on the bits/sec vs baud.

In older amateur modulation technology, bits per second and baud were one and the same, but that changes with more modern signaling methods. Now we have modulating methods such as BPSK, QPSK, and QAM in addition to the old standby FSK. In these methods, a baud may represent more than one bit. The baud is the quantum of the digital modulation world. It's the smallest change in the signal that represents information. In quadrature systems, a baud can represent two bits of information. There are 4 distinct states in a quadrature system, 0,1,2,3, which in binary is 2 bits. Moving from one state to another only takes one baud, but it transmits two bits. There are more complex constellations possible, with the next step up normally a 16 way modulation which encodes a nibble, 4 bits, per baud.

This wizardry isn't free, however. The more complex waveform required may actually take up more bandwidth than straight FSK, though with a different energy spectrum. Clever spectrum folding can fit these modulations in a narrow bandwidth, such as in the Clover system, or in high speed telephone modems, but DSP is almost a necessity to make a workable system.

In order to use minimum bandwidth for a given signalling rate without spectrum folding, a method called MSK, or Minimum Shift Keying may be applied. As implemented in the GRAPES modem, this system has a minimum quantum of a 90 degree phase shift of the carrier. Backward to represent a state change, and forward to represent no change of state. This is the baud of the system, and it's also the bits per second of the system. It's basically a 14 kHz rate modulation of a 56 kilobaud data stream. The data is in NRZI format and there is a randomizer, or scrambler of 17 bits length. This creates a pattern that repeats every 131,071 clock pulses and guarantees a transition for every clock pulse. The GRAPES modem actually uses a modified

form of MSK to reduce bandwidth. There is a 3 db amplitude variation imposed on the transition waveforms so that the spectrum is tightly contained at 1.2 Hz per baud. Thus a 56 kb data stream can be fitted into a 70 kHz channel. With normal AFSKed FM, as used at 1200 baud on the amateur bands, a 20 kHz channel is required, making it about 14 times less efficient.

Gary

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Gary Coffman KE4ZV	"If 10% is good enough	gatech!wa4mei!ke4zv!gary
Destructive Testing Systems	for Jesus, it's good	uunet!rsiatl!ke4zv!gary
534 Shannon Way	enough for Uncle Sam."	emory!kd4nc!ke4zv!gary
Lawrenceville, GA 30244	-Ray Stevens	

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Date: 17 Aug 93 18:43:35 GMT  
From: optilink!walsh@uunet.uu.net  
Subject: Small TNC?  
To: packet-radio@ucsd.edu

In article <Aug03.223816.25137@acs.ucalgary.ca>,  
trond@smith.phys.ucalgary.ca (Trond Trondsen) wrote:

> I would like to go portable on packet and now I wonder what is the (physically)  
> smallest TNC available?

The Baypac BP-1 is the size of a DB-25 connector and its cover, and it self powered off of the serial port. Drawbacks are that it may not work with some serial ports that don't have the proper 12 volt RS-232 levels, and it is not TAPR2 compatible. The software that it comes with does generally work well for most users, though.

Cheers -- Mark -- KM6XU @ WX3K

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Mark Walsh (walsh@optilink.com) -- UUCP: uunet!optilink!walsh  
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"What, me worry?" - William M. Gaines, 1922-1992  
"I'm gonna crush you!" - Andre the Giant, 1946-1993

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End of Packet-Radio Digest V93 #243

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